IN THE CLAIMS:

1.(Original) A method for assigning a pulse profile, in particular a pulse profile of a scintillation detector having at least two scintillation materials with different decay characteristics, to one of a plurality of pulse types with differing decay times, comprising the method steps of

- acquiring an output pulse profile and converting the pulse profile into an electrical signal whose amplitude-time profile represents the pulse profile of the output pulse;
- transforming the amplitude-time profile into the frequency space in order to obtain an amplitude-frequency profile representing the output pulse;
- normalizing the amplitude-frequency profile in order to obtain a normalized amplitude-frequency profile;
- comparing the normalized amplitude-frequency profile with a predetermined reference profile; and
- assigning the output pulse profile to one of the pulse types on the basis of the result of the comparison.

2. (Original) The method as defined in Claim 1, wherein the electrical signal is subjected, prior to the transformation into the frequency space, to an analog/digital conversion with a predetermined sampling rate, in order to obtain a discrete amplitude-time profile representing the output pulse.

3. (Original) The method as defined in Claim 2, wherein in the transforming step, the discrete amplitude-time profile is subjected to a discrete Fourier transform (DFT) in order to obtain a discrete amplitude-frequency profile.

4. (Original) The method as defined in Claim 3, wherein the discrete Fourier transform is calculated using a fast Fourier transform (FFT).

5. (Currently amended) The method as defined in ~~any of the foregoing claims~~ Claim 1, wherein in the normalizing step, the amplitude-frequency profile is referred to the amplitude at a frequency of zero; in particular, the amplitude-frequency profile is divided by the amplitude at a frequency of zero.

6. (Currently amended) The method as defined in ~~any of the foregoing claims~~ Claim 1, wherein in the comparison step, the difference profile between the normalized amplitude-frequency profile and the reference profile is determined, the difference profile for each frequency is multiplied by a predetermined weighting factor, and the sum of those products over all frequencies is calculated as the assignment parameter.

7. (Original) The method as defined in Claim 6, wherein the assignment to one of the pulse types is performed on the basis of the sign and/or the absolute value of the assignment parameter.

8. (Currently amended) The method as defined in Claim 6 ~~or 7~~, wherein the output pulse profile is assigned to one of two pulse types with differing decay times, and the assignment is performed only on the basis of the sign of the assignment parameter.

9. (Currently amended) The method as defined in ~~any of Claims 6 through 9~~ Claim 6, wherein the weighting factor has a maximum at small frequencies and decreases toward large frequencies.

10. (Currently amended) The method as defined in ~~any of the foregoing claims~~ Claim 1, wherein high-frequency components of the electrical signal are suppressed by a lowpass filter before transformation into the frequency space.

11. (Currently amended) The method as defined in ~~any of the foregoing claims~~ Claim 1, wherein prior to the acquisition of pulse profiles that are to be assigned, a reference profile is determined by

- acquiring calibration pulse profiles having a known assignment to two pulse types with differing decay times, and converting the respective pulse profiles into an electrical signal whose amplitude-time profile represents the pulse profile of the calibration pulse;
- transforming the respective amplitude-time profile into the frequency space in order to obtain an amplitude-frequency profile representing the calibration pulse;
- normalizing the amplitude-frequency profile in order to obtain a normalized amplitude-frequency profile; and

- defining a reference value for each frequency in such a way that the amplitude values of the calibration pulses of the first pulse type for that frequency are substantially greater than the reference value, and the amplitude values of the calibration pulses of the second pulse type for that frequency are substantially less than the reference value.

12. (Original) The method as defined in Claim 11, wherein the reference value for each frequency is defined by the fact that an amplitude histogram is prepared for each of the various pulse types, the intersection point of the envelopes of the histograms is identified, and the identified intersection point is defined as the reference value.

13. (Currently amended) The method as defined in Claim 11 ~~or 12~~, wherein prior to the acquisition of pulse profiles to be assigned, the weighting factor is determined for each frequency by
    - determining the average magnitude of the deviation of the amplitude values from the reference value for that frequency, for each of the pulse types; and
    - defining a high weighting for that frequency for a large average deviation magnitude, and a low weighting for that frequency for a low average deviation magnitude.

14. (Currently amended) An apparatus for carrying out the method described as defined in ~~any of Claims 1 through 13~~ Claim 1, comprising
    - a means for acquiring an output pulse profile and a means (10) for converting the pulse profile into an electrical signal whose amplitude-time profile represents the pulse profile of the output pulse;
    - a means (28) for transforming the amplitude-time profile into the frequency space in order to obtain an amplitude-frequency profile representing the output pulse;
    - a means (30) for normalizing the amplitude-frequency profile in order to obtain a normalized amplitude-frequency profile;
    - a means (32, 34) for comparing the normalized amplitude-frequency profile with a predetermined reference profile; and
    - a means (36) for assigning the output pulse profile to one of the pulse types on the basis of the result of the comparison, and for outputting the assignment result.

15. (Original) The apparatus as defined in Claim 14, in which the means (32, 34) for comparing and the means (36) for assigning are constituted by a user-programmable logic circuit (FPGA) or a digital signal processor (DSP) or (PC).

16. (Original) The apparatus as defined in Claim 15, in which the means (28) for transforming and the means (30) for normalizing are constituted by a user-programmable logic circuit (FPGA) or a digital signal processor (DSP) or (PC).